Unit Operations in Food Engineering

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Preface

One of the primary objectives of the food industry is to transform, by a series of operations, raw agricultural materials into foods suitable for consumption. Many different types of equipment and several stages are used to perform these transformations. The efficient calculation and design of each stage — called unit or basic operation — is one of the main purposes of food engineering.

The systematic study of unit operations began in the chemical engineering field, where calculation tools were developed to describe, based on engineering principles, the changes taking place in each processing step. This knowledge has been applied to food engineering and, at the same time, has been adapted to the particular and distinctive nature of the raw materials used. The goal of any series of operations is not just to obtain optimum production, but also a food product suitable for consumption and of the highest quality. Thus, in the application of unit operations to a food process, exhaustive and careful calculation is essential to obtaining process stages that cause minimum damage to the food that is being processed.

The main objective of this book is to present, in progressive and systematic form, the basic information required to design food processes, including the necessary equipment. The number of food engineering unit operations is quite extensive, but some are rarely applied because they are quite specific to a given commodity or process. This book covers those unit operations that, in the opinion of the authors, are most relevant to the food industry in general. The first chapters contain basic information on transport phenomena governing key unit operations, followed by chapters offering a detailed description of those selected unit operations. To facilitate the understanding of all the studied unit operations, each chapter concludes with a set of solved problems.

We hope this book will be useful as a reference for food engineers and as a text for advanced undergraduate and graduate students in food engineering. We also hope this book will be a meaningful addition to the literature dealing with food processing operations.

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